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Hydrology and Earth System Sciences Discussions

Interactive comment on "Stage level, volume, and time-frequency information content of Lake Tana using stochastic and wavelet analysis methods" *by* Y. Chebud and A. Melesse

Anonymous Referee #1

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Title: Stage Level, Volume, and Time-frequency Information Content of Lake Tana using Stochastic and Wavelet Analysis Methods Authors: Chebud, Y., Melesse, A. Manuscript submitted to HESS Disc.

The paper presents an approach for predicting lake water levels of Lake Tana of Ethiopia using a stochastic approach based on perturbation method, Monte Carlo and Wavelet analysis. A comparison is done with results obtained elsewhere with deterministic approaches applied to the same case-study. The main comments are:

1. The manuscript is difficult to read. The introduction to the problem, methodology,

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analysis of results and conclusions are too short for the general readability of most readers of HESS. All these sections need to be elaborated giving a formal introduction and explanation of the results obtained. If space is the problem then I will recommend to remove some components (e.g. the wavelet component).

2. The first figure on pp 3 is without a number and caption. Please provide numbers and captions to all figures and refer them in the text.

3. Figure 2: I have difficulty in connecting the explanation with the figure. Both normal and log-normal plots look similar, and R2 is not terribly different.

4. Figure 3: it is not clear how the authors can conclude about the high periodicity of monthly data.

5. The authors claimed that the mathematical formulation adopted in the manuscript follows that of Amemiya et al. I failed to find any connection with the referred paper. The authors need to have a serious editing of the literature provided. Currently, the literature provided is fairly inadequate. Stochastic approaches and wavelets have been applied in hydrology by many others.

6. Equations 1 to 7 are the cornerstone of the presented methodology. This section does not have enough information to have clarity. There is very little reference (including the reference which I could not connect). Equation 2 and 3: for clarity the symbols for averages also should be defined.

7. Figure 4a and 4b: these figures are difficult to read. Indeed the perturbation and the Monte Carlo method simulate the droughts of three mentioned years. Have they been compared with the actual drought level of these years? How is the performance of these models for other years? There is no reference for the results obtained with the 'waterbalance method'.

8. The claimed complementarity of the wavelets to the stochastic approach is not obvious.

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9. A location map could be useful.

10. The conclusions are really a summary of the results obtained. The authors need to provide a bulleted list of conclusions that can be substantiated from the study.

11. Other comments: a. Equations are hard to read (may be pasted as pictures?) b. Language editing is needed, which I am convinced that the authors themselves can do it. Page 4 refers to Ameniya et al., which actually is Amemiya et al.

Recommendation: Major revision. The manuscript needs to be updated with the comments provided, and should be re-submitted for re-review.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 7, 5525, 2010.